ICSE 2026 EXAMINATION

SPECIMEN QUESTION PAPER

MATHEMATICS

Maximum Marks: 80

Time allowed: Three hours

1. *Answers to this Paper must be written on the paper provided separately.*
2. *You will not be allowed to write during first 15 minutes.*
3. *This time is to be spent in reading the question paper.*
4. ***The time given at the head of this Paper is the time allowed for writing the answers.***

5. *Attempt **all** questions from **Section A** and **any four** questions from **Section B**.*
6. ***All working, including rough work, must be clearly shown, and must be done on the same sheet as the rest of the answer.***
7. ***Omission of essential working will result in loss of marks.***
8. *The intended marks for questions or parts of questions are given in brackets [ ].*
9. ***Mathematical tables are provided**.*

Instruction for the Supervising Examiner

Kindly read aloud the Instructions given above to all the candidates present in the Examination Hall.

NOTE:

The Specimen Question Paper in the subject provides a realistic format of the Board Examination Question Paper and should be used as a practice tool. The questions for the Board Examination can be set from any part of the syllabus. However, the format of the Board Examination Question Paper will remain the same as that of the Specimen Question Paper.

SECTION A (40 Marks)

*(Attempt **all** questions from this Section.)*

Question 1

Choose the correct answers to the questions from the given options. [15]

(Do not copy the question, write the correct answers only.)

(i) $(x-2)$ and $(x+2)$ are the factors of x^3+x^2-4x-4. The third factor of the given polynomial is:

(a) $(x-1)$

(b) $(x-4)$

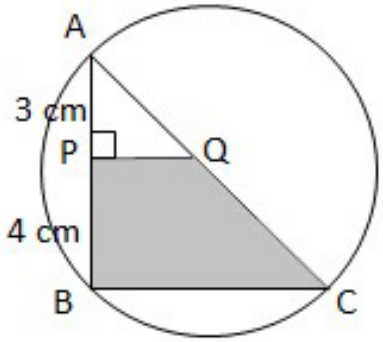
(c) $(x+1)$

(d) $(x+4)$ **[Analyze]**

(iii) In the figure given below, AC is a diameter of the circle.

AP = 3 cm and PB = 4 cm and QP ⊥ AB.

If the area of ΔAPQ is18 cm^2, then the area of shaded portion QPBC is:



(a) 32 cm^2

(b) 49 cm^2

(c) 80 cm^2 **[Understanding & Analysis]**

(d) 98 cm^2

(ii) Radha deposited ₹400 per month in a recurring deposit account for 18 months.

The qualifying sum of money for the calculation of interest is:

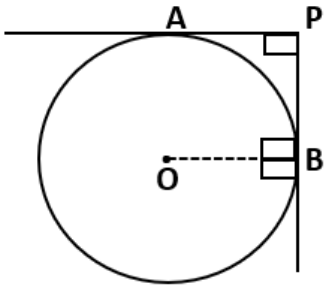
(a) ₹ 3,600

(b) ₹ 7,200

(c) ₹ 68,400

(d) ₹ 1,36,800 **[Application]**

(iv) In the given diagram, the radius of the circle with centre O is 3 cm. PA and PB are the tangents to the circle which are at right angle to each other. The length of OP is:



(a) $\frac{3}{\sqrt{2}} cm$

(b) $3\ cm$

(c) $3\sqrt{2}\ cm$

(d) $6\sqrt{2}\ cm$ **[Analysis & Evaluation]**

(v) **Assertion (A):** If $sec\theta + tan\theta = a\ and\ sec\theta - tan\theta = b$ then ab =1

Reason (R): $sec^2\theta - tan^2\theta = 1$

(a) (A) is true and (R) is false.

(b) (A) is false and (R) is true.

(c) Both (A) and (R) are true and (R) is the correct explanation of (A).

(d) Both (A) and (R) are true, but (R) is not the correct explanation of (A). **[Analysis & Evaluation]**

(vi) A solid sphere is cut into two identical hemispheres.

Assertion (A): The total volume of two hemispheres is equal to the volume of the original sphere.

Reason (R): The total surface area of two hemispheres together is equal to the surface area of the original sphere.

(a) (A) is true, (R) is false.

(b) (A) is false, (R) is true. **[Analysis]**

(c) Both (A) and (R) are true and (R) is the correct explanation of (A).

(d) Both (A) and (R) are true, but (R) is not the correct explanation of (A).

(vii) Given that the sum of the squares of the first seven natural numbers is 140, then their mean is:

(a) 20

(b) 70

(c) 280 **[Understanding & Evaluation]**

(d) 980

(viii) A bag contains 3 red and 2 blue marbles. A marble is drawn at random. The probability of drawing a black marble is:

(a) 0

(b) $\frac{1}{5}$

(c) $\frac{2}{5}$

(d) $\frac{3}{5}$ **[Application]**

(ix) If matrix $A=[-1 \quad 2]$ and matrix $B=\begin{bmatrix}3\\4\end{bmatrix}$, then matrix AB is equal to:

(a) $[-3]$

(b) $[8]$

(c) $[5]$

(d) $\begin{bmatrix}-1 & 2\\3 & 4\end{bmatrix}$ **[Analysis]**

(x) A mixture of paint is prepared by mixing 2 parts of red pigments with 5 parts of the base. Using the given information in the following table, find the values of a, b & c to get the required mixture of paint.

Parts of red pigment	2	4	**b**	6
Parts of base	5	**a**	12.5	**c**

(a) a = 10, b = 10, c = 10

(b) a = 5, b = 2, c = 5

(c) a = 10, b = 5, c = 10

(d) a = 10, b = 5, c = 15

[Application & Evaluation]

(xi) An article which is marked at ₹ 1,200 is available at a discount of 20% and the rate of GST is 18%. The amount of SGST is:

(a) ₹ 216.00

(b) ₹ 172.80

(c) ₹ 108.00

(d) ₹ 86.40

[Analysis & Evaluation]

(xii) The sum of money required to buy 50, ₹ 40 shares at ₹ 38.50 is:

(a) ₹ 1,920

(b) ₹ 1,924

(c) ₹ 1,925

(d) ₹ 1,952

[Application]

(xiii) The roots of quadratic equation $x^2 - 1 = 0$ are:

(a) 0, 0

(b) 1, 1

(c) -1, -1

(d) +1, -1

[Analysis & Evaluation]

(xiv) Which of the following equations represents a line equally inclined to the axes?

(a) $2x - 3y + 7 = 0$

(b) $x - y = 7$

(c) $x = 7$

(d) $y = -7$

[Analysis & Evaluation]

(xv) Given, $x + 2 \leq \frac{x}{3} + 3$ and x is a prime number. The solution set for x is:

(a) $\emptyset$

(b) $\{0\}$

(c) $\{1\}$

(d) $\{0, 1\}$

[Understanding & Analysis]

Question 2

(i) While factorizing a given polynomial, using remainder & factor theorem, a student finds that $(2x + 1)$ is a factor of $2x^3 + 7x^2 + 2x - 3$. [4]

(a) Is the student's solution correct stating that $(2x + 1)$ is a factor of the given polynomial?

(b) Give a valid reason for your answer.

[Analysis & Application]

Also, factorize the given polynomial completely.

(ii) P is a point on the x- axis which divides the line joining A (- 6, 2) and B (9, - 4). Find: [4]

(a) the ratio in which P divides the line segment AB.

(b) the coordinates of the point P.

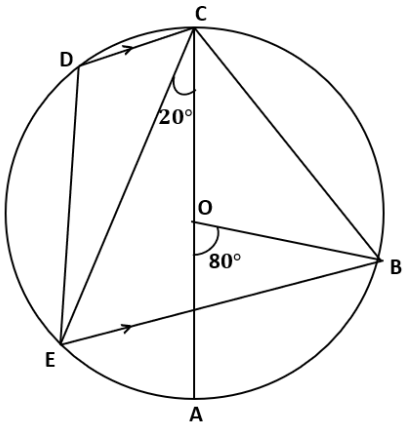
(c) equation of a line parallel to AB and passing through (-3, -2).

[Analysis & Evaluation]

(iii) In the given figure, AC is the diameter of the circle with centre O. [4]

CD is parallel to BE.

∠AOB = 80º and ∠ACE = 20º.



[Analysis & Evaluation]

Calculate:

(a) ∠ BEC

(b) ∠ BCD

(c) ∠CED

Question 3

(i) -11, -7, -3, ……,49, 53 are the terms of a progression. [4]

Answer the following:

(a) What is the type of progression?

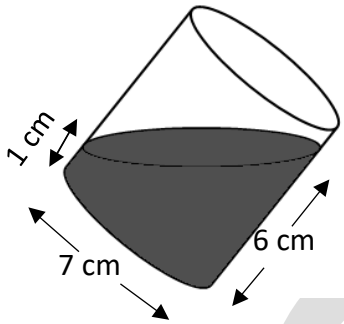
(b) How many terms are there in all?

(c) Calculate the value of middle most term.

[Analysis & Evaluation]

(ii) In the diagram given below, a tilted right circular cylindrical vessel with base diameter 7 cm contains a liquid. When placed vertically, the height of the liquid in the vessel is the mean of two heights shown in the diagram. Find the area of wet surface, when the cylinder is placed vertically on a horizontal surface. [4]

(Use $\pi = \frac{22}{7}$).



[Application & Evaluation]

(iii) Use a ruler and compass to answer this question. [5]

(a) Construct a circle of radius 4.5cm and draw a chord AB of length 6.5 cm.

(b) At A, construct ∠CAB=75°, where C lies on the circumference of the circle.

(c) Construct the locus of all points equidistant from A and B.

(d) Construct the locus of all points equidistant from CA and BA.

(e) Mark the point of intersection of the two loci as P. Measure and write down the length of CP.

[Analysis & Understanding]

SECTION B (40 Marks)

*(Attempt **any four** questions from this Section.)*

Question 4

(i) Ms. Kaur invested ₹ 8,000 in buying ₹100 shares of a company paying 6% dividend at ₹ 80. After a year, she sold these shares at ₹75 each and invested the proceeds including the dividend received during the first year in buying ₹ 20 shares, paying 15% dividend at ₹ 27 each. Find the: [3]

(a) dividend received by her during the first year.

(b) number of shares purchased by her using the total proceeds.

Application & Evaluation]

(ii) Solve the following inequation, write the solution set, and represent it on the real number line. [3]

$5x - 21 < \frac{5x}{7} - 6 \leq -3\frac{3}{7} + x, x \in R.$

[Evaluation]

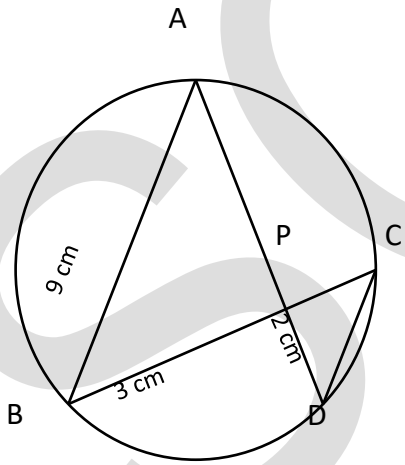
(iii) Prove the following trigonometry identity: [4]

$(\sin\theta + \cos\theta)(\operatorname{cosec}\theta - \sec\theta) = \operatorname{cosec}\theta.\sec\theta - 2\tan\theta$

[Application & Analysis]

Question 5

(i) In the given figure (not drawn to scale) chords AD and BC intersect at P, where AB = 9 cm, PB = 3 cm and PD = 2 cm. [3]



(a) Prove that ΔAPB ~ ΔCPD.

(b) Find the length of CD.

(c) Find area ΔAPB : area ΔCPD.

[Application & Evaluation]

(ii) Mr. Sam has a recurring deposit account and deposits ₹ 600 per month for 2 years. If he gets ₹ 15,600 at the time of maturity, find the rate of interest earned by him. [3]

[Application & Evaluation]

(iii) Using step-deviation method, find mean for the following frequency distribution: [4]

Class	0 – 15	15 – 30	30 – 45	45 – 60	60 – 75	75 – 90
Frequency	3	4	7	6	8	2

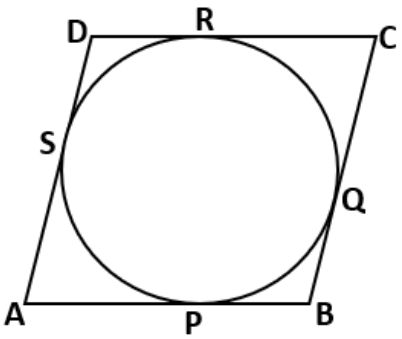
[Application & Evaluation]

Question 6

(i) Find the coordinates of the centroid P of the ΔABC, whose vertices are A(–1, 3), B(3, –1) and C(0, 0). Hence, find the equation of a line passing through P and parallel to AB. [3]

[Analysis & Evaluation]

(ii) In the given figure, the parallelogram ABCD circumscribe a circle, touching circle at P, Q, R and S. [3]



[Analysis & Application]

(a) Prove that: AB = BC

(b) What special name can be given to the parallelogram ABCD?

(iii) The following bill shows the GST rate and the marked price of articles: [4]

Rajdhani Departmental Store				
S. No.	Item	Marked Price	Discount	Rate of GST
(a)	Dry fruits (1 kg)	₹ 1200	₹100	12%
(b)	Packed Wheat flour (5kg)	₹ 286	Nil	5%
(c)	Bakery products	₹ 500	10%	12%

[Application & Evaluation]

Find the total amount to be paid (including GST) for the above bill.

Question 7

(i) Draw the necessary diagram for this question. [5]

A man on the top of a lighthouse observes the angle of depression of two ships on the opposite sides of the lighthouse as 30° and 50° respectively. If the height of the lighthouse is 80m, find the distance between the two ships. Give your answer correct to the nearest meter.

(Use Mathematical Tables for this Question)

[Understanding, Application & Evaluation]

(ii) The marks of 200 students in a test were recorded as follows: [5]

Marks %	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	60 - 70	70 - 80	80 - 90	90 - 100
No. of students	5	7	11	20	40	52	36	15	9	5

Using a graph sheet draw ogive for the given data and use it to find the:

(a) median.

(b) number of students who obtained more than 65% marks.

(c) number of students who did not pass, if the pass percentage was 35.

[Application, Analysis & Evaluation]

Question 8

(i) A box containing cards numbered between 0 and 100 are shuffled and a card is picked at random. Find the probability of getting a card which is: [3]

(a) divisible by 6.

(b) not divisible by 6.

[Application & Evaluation]

(ii) If x, y and z are in continued proportion, prove that: [3]

$$\frac{x}{y^2.z^2}+\frac{y}{z^2.x^2}+\frac{z}{x^2.y^2}=\frac{1}{x^3}+\frac{1}{y^3}+\frac{1}{z^3}$$

[Application & Analysis]

(iii) A manufacturing company prepares spherical ball bearings, each of radius 7 mm and mass 4 gm. These ball bearings are packed into boxes. Each box can have a maximum of 2156 cm^3 of ball bearings. Find the: [4]

(a) maximum number of ball bearings that each box can have.

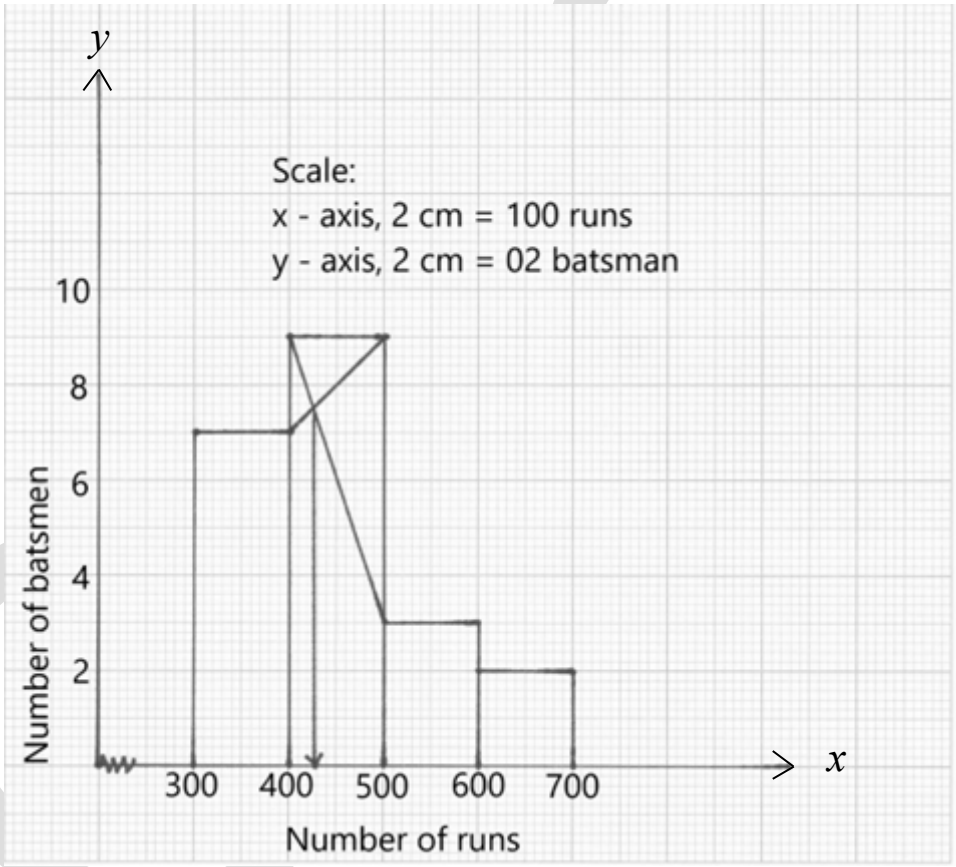
(b) mass of each box of ball bearings in kg.

(Use $\pi = \frac{22}{7}$)

[Analysis, Application & Evaluation]

Question 9

(i) Study the graph given below and answer the following: [3]



(a) Number of batsmen who scored 500 to 700 runs

(b) Modal class interval

(c) The value of mode

[Analysis & Evaluation]

(ii) An Arithmetic Progression (A.P.) has 3 as its first term. The sum of the first 8 terms is twice the sum of the first 5 terms. Find the common difference of the A.P. [3] **[Analysis, Application & Evaluation]**

(iii) The roots of equation $(q - r)\,x^2 + (r - p)\,x + (p - q) = 0$ are equal.

Prove that: $2q = p + r$, that is, p, q & r are in A.P. [4] **[Application & Analysis]**

Question 10

(i) The sum of the squares of three consecutive even numbers is 596. Find the numbers. [3] **[Analysis, Application & Evaluation]**

(ii) Given matrix, $X = \begin{bmatrix} 1 & 1 \\ 8 & 3 \end{bmatrix}$ *and* $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$, prove that $X^2 = 4X + 5I$. [3] **[Application & Evaluation]**

(iii) Use a graph sheet for this question. Take 1 cm = 1 unit along both the x and y axis. Plot ABCDE, where A (4, 0), B (4, 2), C (2, 2), D (2,4) and E (0,4). [4]

(a) Reflect the points A, B, C and D on the y-axis and name them as F, G, H and I respectively.

(b) Join the points A, B, C, D, E, I, H, G and F in order. Reflect the figure ABCDEIHGF on the x-axis and name it as AMNPQRSTF.

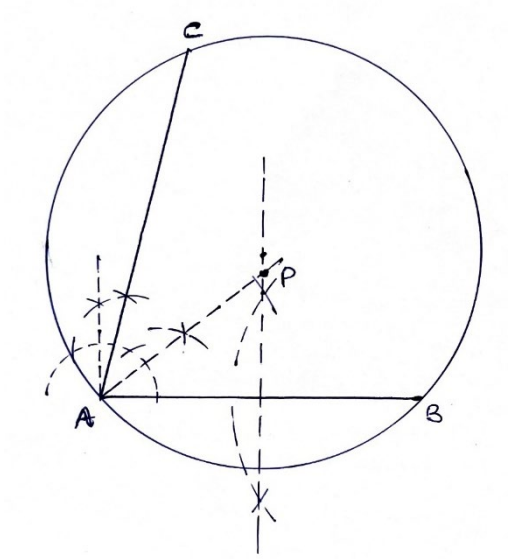
(c) Give the geometrical name of the closed figure AEFQ. **[Understanding]**

ICSE 2026 SPECIMEN

DRAFT MARKING SCHEME – MATHEMATICS

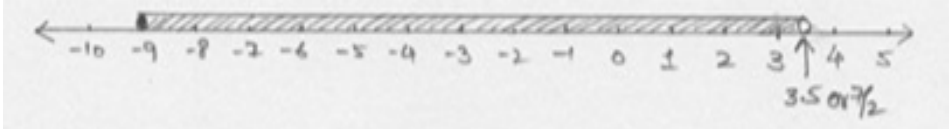
Question 1		
(i)	(c) (x+1)	.[15]
(ii)	(c) ₹ 68,400	
(iii)	(c) 80 cm^2	
(iv)	(c) $3\sqrt{2}$	
(v)	(c) Both (A) and (R) is true and (R) is the correct reason for (A).	
(vi)	(a) (A) is true, (R) is false.	
(vii)	(a) 20	
(viii)	(a) 0	
(ix)	(c) [5]	
(x)	(d) a = 10, b = 5, c = 15	
(xi)	(d) ₹ 86.40	
(xii)	(c) ₹1925	
(xiii)	(d) +1, -1	
(xiv)	(b) $x - y = 7$	
(xv)	(a) Ø	
Question 2		
(i)	$f(x) = \boldsymbol{2x^3 + 7x^2 + 2x - 3}$ $f\left(-\frac{1}{2}\right) = 2\left(-\frac{1}{2}\right)^3 + 7\left(-\frac{1}{2}\right)^2 + 2\left(-\frac{1}{2}\right) - 3 \neq 0$ $\therefore (2x+1)\ is\ not\ a\ factor\ of\ f(x).$ $f\left(\frac{1}{2}\right) = 2\left(\frac{1}{2}\right)^3 + 7\left(\frac{1}{2}\right)^2 + 2\left(\frac{1}{2}\right) - 3 = 0$ $\therefore (2x-1)\ is\ a\ factor\ of\ f(x)$	[4]

	$$\begin{array}{r} x^2+4x+3 \\ 2x-1\overline{)\,2x^3+7x^2+2x-3} \\ \underline{2x^3-x^2} \\ 8x^2+2x \\ \underline{8x^2-4x} \\ 6x-3 \\ \underline{6x-3} \\ \times\times \end{array}$$ $$f(x)=(2x-1)(x^2+4x+3)$$ $$f(x)=(2x-1)(x+3)(x+1)$$	
(ii)	(a) $y=0$ $\frac{-4m+2n}{m+n}=0,\ 4m=2n\rightarrow m:n=1:2$ (b) $x=\frac{9\times1+2\times(-6)}{3}=-1$ $P(-1,0)$ (c) $m_{AB}=\frac{-4-2}{9+6}=\frac{-6}{15}=-\frac{2}{5}$ $y+2=-\frac{2}{5}(x+3)\rightarrow 2x+5y=-16$	[4]
(iii)	(a) $\angle BOC=180°-80°=100°\rightarrow\angle BEC=\frac{1}{2}\times100°=50°$ ($\angle$ *at centre is twice the* $\angle$ *in remaining segment*) (b) $\angle BCD=\angle BCA+\angle ACE+\angle ECD=40°+20°+50°=110°$ (c) $\angle CED=180°-110°-50°=20°$	[4]
Question 3		
(i)	(a) *A.P.* (b) $l=53, a+(n-1)d=53$ $-11+(n-1)4=53\rightarrow n=17$ (c) Middle term $=\left(\frac{17+1}{2}\right)^{th}\ term=9^{th}term$ $T_9=a+8d=-11+8\times4=21$	[4]
(ii)	$h=\frac{1}{2}(1+6), given\ \rightarrow h=\frac{7}{2}$ $Area\ of\ wet\ surface=\ \pi r^2+2\pi rh\ \rightarrow\pi r(r+2h)$ $=\frac{22}{7}\times\frac{7}{2}\left(\frac{7}{2}+2\times\frac{7}{2}\right)=115.5\ cm^2$	[4]

(iii)	 (a) $Length\ of\ CP = 4.9\ cm.$	[5]

SECTION – B

Question 4

(i)	(a) $No.of\ shares = \frac{8000}{80} = 100$ $Annual\ Dividend = \frac{6 \times 100 \times 100}{100} = ₹600$ (b) $Sale\ proceeds = ₹75 \times 100 = ₹7500$ $and\ Total\ proceeds = ₹8100$ $No.of\ shares = \frac{8100}{27} = 300$	[3]
(ii)	$5x - 21 < \frac{5x}{7} - 6 \leq -3\frac{3}{7} + x, x \in R$ $5x - 21 < \frac{5x}{7} - 6$ $5x - \frac{5x}{7} < -6 + 21$ $\frac{35x - 5x}{7} < 15$ $30x < 105$ $x < 3.5$ $\frac{5x}{7} - 6 \leq -3\frac{3}{7} + x$ $\frac{5x}{7} - x \leq -\frac{24}{7} + 6$ $\frac{5x - 7x}{7} \leq \frac{-24 + 42}{7}$ $-2x \leq 18$ $x \geq -9$ $\left\{x: -9 \leq x < \frac{7}{2}, x \in R\right\}$ 	[3]

(iii) [4]

$$LHS = (\sin\theta + \cos\theta)(\operatorname{cosec}\theta - \sec\theta)$$

$$= (\sin\theta + \cos\theta)\left(\frac{1}{\sin\theta} - \frac{1}{\cos\theta}\right) = (\sin\theta + \cos\theta)\left(\frac{\cos\theta - \sin\theta}{\sin\theta.\cos\theta}\right)$$

$$= \frac{\cos^2\theta - \sin^2\theta}{\sin\theta.\cos\theta} = \frac{1 - 2\sin^2\theta}{\sin\theta.\cos\theta} = \frac{1}{\sin\theta.\cos\theta} - \frac{2\sin^2\theta}{\sin\theta.\cos\theta}$$

$$= \operatorname{cosec}\theta.\sec\theta - 2\tan\theta = RHS$$

Question 5

(i) [3]

(a) $In\ \Delta APB\ and\ \Delta CPD, \angle BAP = \angle DCP\ \ (\angle s\ on\ same\ segment)$

$\angle ABP = \angle CDP\ \ (\angle s\ on\ same\ segment)$

$\therefore \Delta APB \sim \Delta CPD\ \ (AA\ axiom)$

(b) $\frac{AB}{CD} = \frac{3}{2}\ \therefore CD = 6cm$

(c) $\frac{area\ (\Delta APB)}{area\ \Delta CPD} = \frac{BP^2}{DP^2} = \frac{9}{4} \rightarrow 9:4$

(ii) [3]

$$Interest = \frac{600 \times 24 \times 25}{2} \times \frac{r}{100} \times \frac{1}{12} = 150\,r$$

$$Maturity\ Value = ₹15600$$

$$600 \times 24 + 150r = ₹15600$$

$$150r = ₹15600 - ₹14400 \rightarrow r = \frac{1200}{150} = 8\%$$

(iii) [4]

Class	x	$u = d/i$	f	fu
0 – 15	7.5	-3	3	-9
15 – 30	22.5	-2	4	- 8
30 – 45	37.5	-1	7	-7
45 – 60	52.5	0	6	0
60 – 75	67.5	1	8	8
75 – 90	82.5	2	2	4
			30	-12

$$Mean = A + \frac{\sum fu}{\sum f} \times i = 52.5 + \frac{-12}{30} \times 15 = 52.5 - 6 = 46.50$$

Question 6

(i) [3]

(a) $P\left(\frac{-1+3+0}{3}, \frac{3+(-1)+0}{3}\right) = P\left(\frac{2}{3}, \frac{2}{3}\right)$

(b) $m_{AB} = \frac{-1-(3)}{3-(-1)} = \frac{-4}{4} = -1 \qquad m_{CD} = -1$

$$Required\ equation, y - \frac{2}{3} = -1\left(x - \frac{2}{3}\right) \rightarrow 3x + 3y = 4$$

(ii) [3]

(a) $AP = AS, BP = BQ, DR = DS \text{ and } CR = CQ$

$(tangents\ drawn\ to\ a\ circle\ from\ an\ external\ pt.\ equal)$

$Adding, (AP + BP) + (DR + CR) = (AS + DS) + (BQ + CQ)$

$AB + DC = AD + BC \rightarrow 2\,AB = 2\,BC \therefore AB = BC$

(b) Rhombus

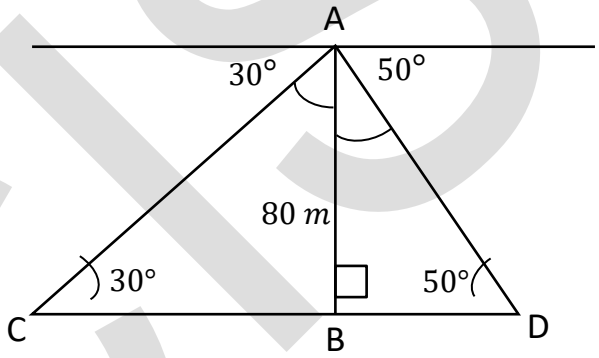
(iii) [4]

Rajdhani Departmental Store

S. No.	*Item*	*Marked Price*	*Discounte Price*	*GST*	*Tax*
1.	*Dry Fruits (1kg)*	₹ 1200	₹ 1100	12%	$\frac{12 \times 1100}{100} = 132$
2.	*Wheat Flour*	₹ 286	₹ 286	5%	$\frac{5 \times 286}{100} = 14.30$
3.	*Bakery Products*	₹ 500	₹ 450	12%	$\frac{12 \times 450}{100} = 54$
Total			₹1836		₹ 200.30
Grand total		₹ 2036.30			

Question 7

(i) [5]



$In\ \Delta ABC, \quad \frac{AB}{BC} = \tan 30°$

$\frac{80}{BC} = \frac{1}{\sqrt{3}} \rightarrow BC = 80\sqrt{3} = 80 \times 1.7321\ m$

$In\ \Delta ABD, \quad \frac{AB}{BD} = \tan 50° \text{ or } \frac{BD}{AB} = tan40°$

$\frac{BD}{80} = 0.8391 \rightarrow BD = 80 \times 0.8391\ m$

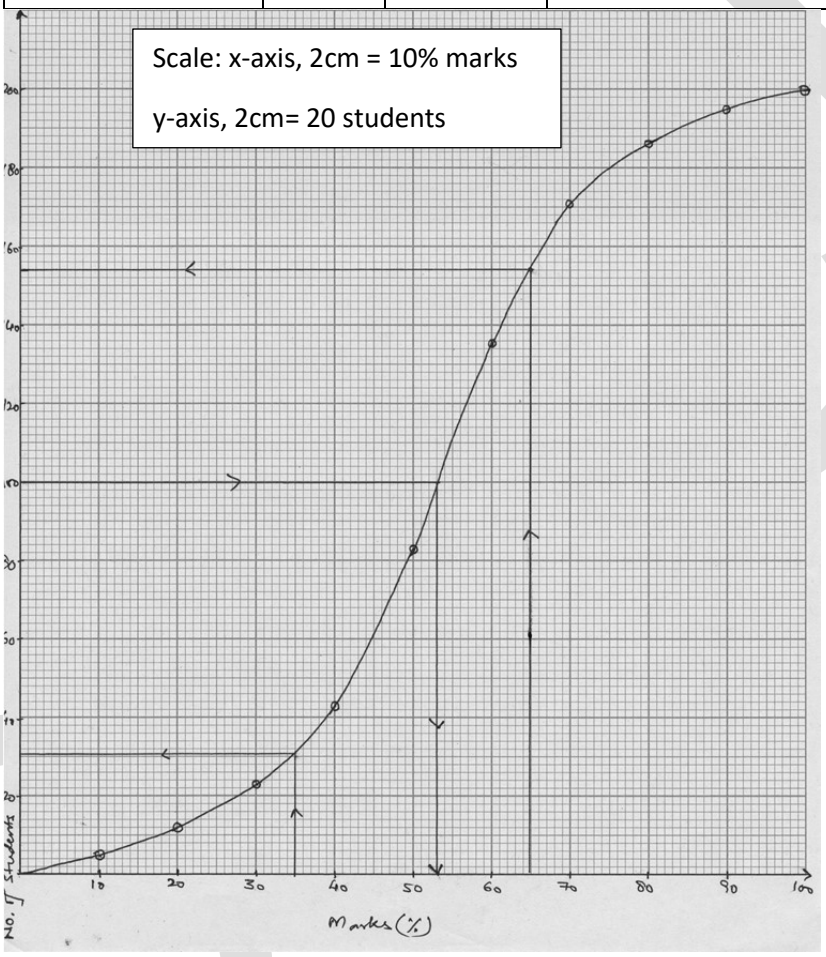
$CD = 80 \times 1.732\ m + 80 \times 0.839\ m = 80(1.7321 + 0.8391)\ m$

$80(2.5712) = 205.696\ m = 206\ m$

(ii)

Marks (%)	f	cf
0 – 10	5	5
10 – 20	7	12
20 – 30	11	23
30 – 40	20	43
40 – 50	40	83
50 – 60	52	135
60 – 70	36	171
70 – 80	15	186
80 – 90	09	195
90 – 100	05	200

(a) $Median = 53 \pm 1$
(b) $More\ than\ 65\% = 46 \pm 2$
(c) $Didn't\ pass = 31 \pm 2$



[5]

Question 8

(i)

(a) {6, 12, 18, 24, 30, 36, 42, 48, 54, 60, 66, 72, 78, 84, 90, 96}

$$P(divisible\ by\ 6) = \frac{16}{99}$$

(b) $P(not\ divisible\ by\ 6) = 1 - \frac{16}{99} = \frac{83}{99}$

[3]

(ii)

$$\frac{x}{y} = \frac{y}{z} \rightarrow y^2 = xz$$

[3]

$$LHS = \frac{x}{y^2.z^2} + \frac{y}{z^2.x^2} + \frac{z}{x^2.y^2} = \frac{x^3+y^3+z^3}{x^2.y^2z^2}$$

$$\frac{x^3+y^3+z^3}{x^3z^3} = \frac{x^3}{x^3z^3} + \frac{y^3}{x^3z^3} + \frac{z^3}{x^3z^3}$$

$$= \frac{1}{z^3} + \frac{y^3}{y^6} + \frac{1}{x^3} = \frac{1}{z^3} + \frac{1}{y^3} + \frac{1}{x^3} = RHS$$

(iii) [4]

(a) $No.of\ ball\ bearings = \frac{2156}{\frac{4}{3}\times\pi\times r^3} = \frac{2156}{\frac{4}{3}\times\frac{22}{7}\times\left(\frac{7}{10}\right)^3}$

$$= \frac{2156\times3\times7\times10\times10\times10}{4\times22\times7\times7\times7} = 1500$$

(b) $Mass\ of\ each\ box = 4\ gm \times 1500 = 6\ kg$

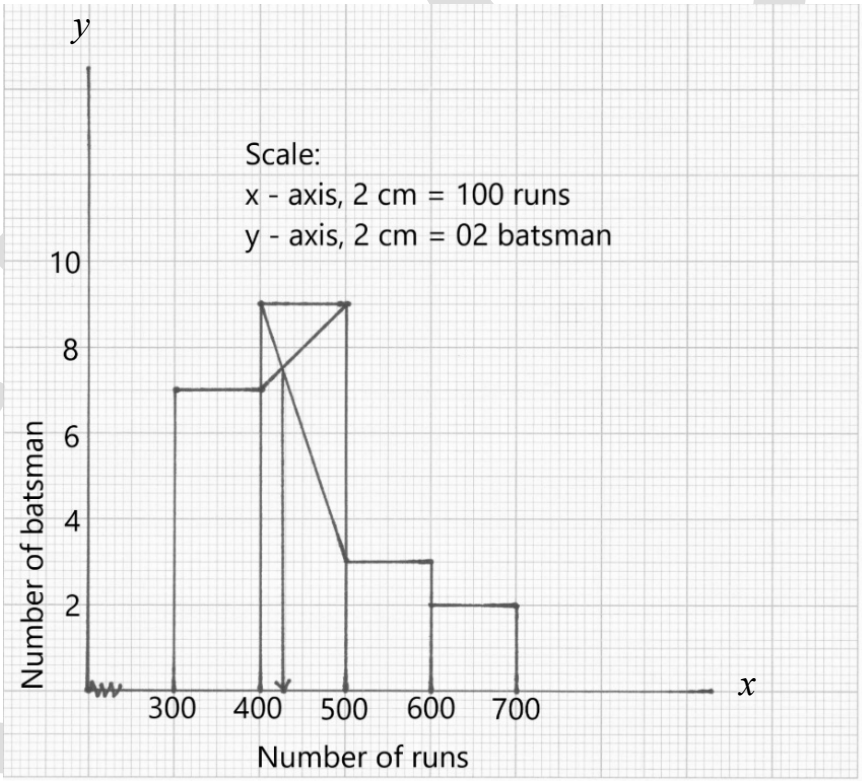
Question 9

(i) [3]

(a) 5

(b) 400 – 500

(c) Mode = 430 runs

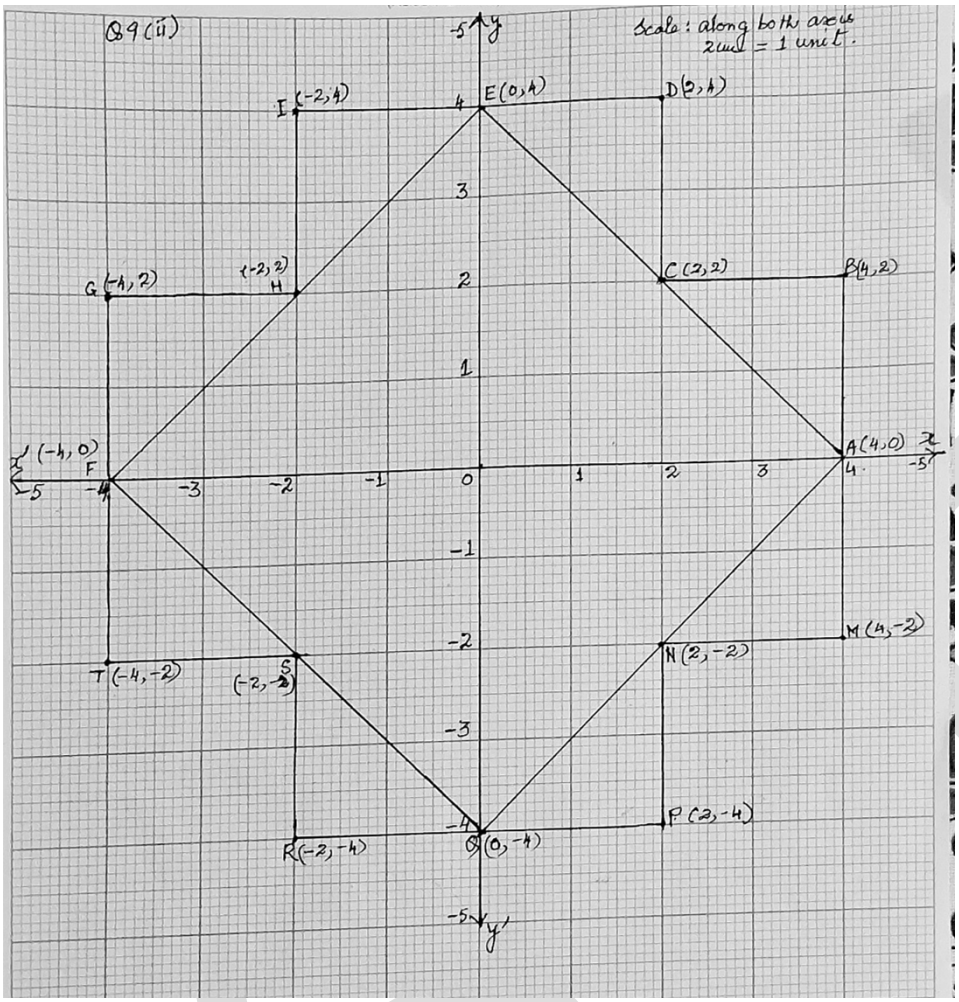


(ii) [3]

$a = 3, \quad S_8 = 2\,S_5 \rightarrow \frac{8}{2}[2\times3+(8-1)d] = 2\left\{\frac{5}{2}[2\times3+(5-1)d]\right\}$

$$4[6+7d] = 5[6+4d] \rightarrow 24+28d = 30+20d \rightarrow d = \frac{3}{4}$$

(iii)	$a = q - r, b = r - p \text{ and } c = p - q$ $for\ equal\ roots, b^2 = 4ac \rightarrow (r-p)^2 = 4\,(q-r)(p-q)$ $r^2 + p^2 - 2pr = 4[pq - q^2 - pr + qr)$ $r^2 + p^2 - 2pr + 4pr = 4[pq - q^2 + qr]$ $(p+r)^2 = 4[q(p+r) - q^2]$ $(p+r)^2 - 4q(p+r) + 4q^2 = 0$ $let\ (p+r) = y$ $y^2 - 4qy + 4q^2 = 0$ $(y-2q)^2 = 0$ $y - 2q = 0$ $or\ p + r = 2q \qquad proved$	[4]
Question 10		
(i)	$let\ three\ numbers\ be\ (x-2), x\ and\ (x+2)$ $(x-2)^2 + x^2 + (x+2)^2 = 596 \rightarrow 3x^2 = 588 \rightarrow x^2 = 196 \quad \therefore x = 14$ The required numbers are 12, 14 & 16	[3]
(ii)	$X^2 = \begin{bmatrix} 1 & 1 \\ 8 & 3 \end{bmatrix}\begin{bmatrix} 1 & 1 \\ 8 & 3 \end{bmatrix}$ $= \begin{bmatrix} 1\times 1 + (1)\times(8) & 1\times(1) + (1)\times 3 \\ (8)\times 1 + 3\times(8) & (8)\times(1) + 3\times 3 \end{bmatrix}$ $= \begin{bmatrix} 1+8 & 1+3 \\ 8+24 & 8+9 \end{bmatrix}$ $\therefore X^2 = \begin{bmatrix} 9 & 4 \\ 32 & 17 \end{bmatrix}$ $and\ 4X = 4\begin{bmatrix} 1 & 1 \\ 8 & 3 \end{bmatrix} = \begin{bmatrix} 4 & 4 \\ 32 & 12 \end{bmatrix}$ $4X + 5I = \begin{bmatrix} 4 & 4 \\ 32 & 12 \end{bmatrix} + \begin{bmatrix} 5 & 0 \\ 0 & 5 \end{bmatrix} = \begin{bmatrix} 9 & 4 \\ 32 & 17 \end{bmatrix}$ $\therefore X^2 = 4X + 5I, \qquad proved$	[3]

(iii)	(a) Square 	[4]